

MONICA E. CARDELLA

September 15, 2021

Director, School of Universal Computing,
Construction, and Engineering Education
Professor of Engineering and Computing Education
Florida International University

College of Engineering and Computing
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EDUCATION

- 2006 **Ph.D.** in Industrial Engineering at the **University of Washington**.
Advisor: Cynthia J. Atman.
Dissertation title: “Engineering mathematics: an investigation of students’ mathematical thinking from a cognitive engineering perspective”
- 2002 **M.Sc.** in Industrial Engineering from the **University of Washington**. Advisor: Cynthia J. Atman.
- 1998 **B.Sc.** in Mathematics from the **University of Puget Sound**. Advisor: Ron VanEnkevort.

EXPERIENCE

- August 2021 – Director, School of Universal Computing, Construction, and Engineering Education (SUCCEED), *Florida International University*
- August 2021 – Professor of Engineering and Computing Education, SUCCEED and STEM Transformation Institute, *Florida International University*
- August 2021 – Adjunct Professor of Engineering Education, *Purdue University*
- August 2019-August 2021 Program Director, Division of Research on Learning in Formal and Informal Settings, *National Science Foundation*
- July 2019 – August 2021 Professor of Engineering Education, *Purdue University*
- June 2014- Aug 2019 Director, *INSPIRE Research Institute for P-12 Engineering*
- July 2013 – June 2019 Associate Professor of Engineering Education, *Purdue University*
- Aug. 2007-June 2013 Assistant Professor of Engineering Education, *Purdue University*
- Oct 2010 – August 2020 Affiliate of the Division of Environmental and Ecological Engineering, *Purdue University*
- 2006-2007 National Academy of Engineering Postdoctoral Fellow, *Stanford University*
- 2005 Research Assistant, *University of Washington, Learning in Informal and Formal Environments (LIFE) Center*
- 2000- 2006 Research Assistant, *University of Washington, Center for Engineering Learning and Teaching*
- 1999-2000 Mathematics and English as a Second Language instruction provider at Bates Technical College, Tacoma, as part of the AmeriCorps program.
- Summer 1998 Teaching Assistant, University of Puget Sound Academic Challenge Program: mathematics, science and engineering enrichment program for underserved (underrepresented minoritized groups, first generation college students, and/or from underrepresented socio-economic status) middle and high school students

HONORS AND AWARDS

- 2021 *Journal of Digital Learning in Teacher Education* Outstanding Research Paper Award: “Instructional Strategies to Promote Computational Thinking for Young Learners”
- 2020 Fellow, American Society for Engineering Education
- 2020 Lifetime Achievement Award, American Society for Engineering Education Pre-College Engineering Education Division
- 2019 American Society for Engineering Education 2019 President’s Award for the Engineering Gift Guide
- 2019 Distinguished Service Award, American Society for Engineering Education Educational Research and Methods Division
- 2019 Best Diversity Paper Award, American Society for Engineering Education Pre-College Division
- 2019 *Design Studies Award* for the best paper published in 2018 in *Design Studies*: “Timescales and Ideospace: an Examination of Idea Generation in Design Practice”
- 2018 Fellow, Big Ten Academic Leadership Program, 2018-2019 (selected Spring 2018).

2018 School of Engineering Education Graduate Student Mentoring Award, 2018.
 2016 INSPIRE Inducted into 100Kin10 Network (for leaders in K-12 STEM Education)
 2015 Fellow, Executive Leadership in Academic Technology and Engineering program, 2015-2016.
 2014 Purdue University's Teaching Academy, induction ceremony September 2014
 2013 Purdue University's College of Engineering Staff Awards of Excellence "Team Award" for First-Year Engineering Course Development
 2011 National Science Foundation CAREER Award
 2011 Purdue University's College of Engineering Faculty Awards of Excellence "Team Award" for INSPIRE (The Institute for P-12 Engineering Research and Learning)
 2008 *William Elgin Wickenden Award* for the best paper published in the Journal of Engineering Education: "Engineering Design Processes: A Comparison of Students and Expert Practitioners"
 2007 NAE/ CASEE *Faculty Fellow Award*, awarded by the Frontiers in Education conference
 2006 National Academy of Engineering, *Postdoctoral Engineering Education Researcher Fellowship* for research with the Center for Design Research at Stanford University (September 2006-August 2007).
 2006 *Apprentice Faculty Grant*, awarded by the Educational Research and Methods division of the American Society for Engineering Education.
 2005 *Outstanding Female Graduate Student* in Industrial Engineering at the University of Washington. Presented by the Society of Women Engineers.
 2004 Inducted member of *Alpha Pi Mu*, the Industrial Engineering Honor Society (served as the Vice President for the University of Washington chapter July 2005-June 2006).

RESEARCH

RESEARCH INTERESTS

Engineering learning in informal environments; design thinking (from preschool to professional practice); equity and inclusion; mathematical thinking in engineering; computational thinking (particularly amongst young learners).

GRANTS AND CONTRACTS

Completed Projects

The National Academy of Engineering's Center for the Advancement of Scholarship in Engineering Education
AGEP PEER Fellowship (September 2006-August 2007). \$95,000. PI.

The National Science Foundation: *IEECI: Formative Feedback: Impacting the Quality of First-Year Engineering Student Work on Modeling Activities* (October 2008- March 2011). \$486,740. Co-PI. Co-investigators: Heidi Diefes-Dux (PI)

The National Science Foundation: *Students' Understanding of Human-Centered Design and the Impact of Service Learning* (September 2009- August 2012). \$400,000. PI. Co-investigators: Bill Oakes (Co-PI)

The National Science Foundation: *IEECI: Assessing Sustainability Knowledge (ASK): Development of a framework to assess engineering undergraduate students' knowledge of sustainability concepts* (September 2009-August 2011). \$150,000. Co-PI. Co-investigators: Alice Pawely (PI); Stephen Hoffmann and Matthew Ohland (Co-PIs)

Purdue University College of Engineering, Engineer of 2020 Seed Grant Program. "Developing Curious and Persistent Continuous Learners: Articulating and Assessing the Role of Information Skills in the First-Year Engineering Curriculum." (June 2010-June 2011) \$40,000. Co-PI. Co-investigators: Michael Fosmire (PI) and Şenay Purzer (Co-PI).

The National Science Foundation: *DRK-12 R&D: Quality Cyber-Enabled, Engineering Education Professional Development to Support Teacher Change and Student Achievement* (September 2008 – August 2014). \$2,995,450. Co-PI. Co-investigators: Heidi Diefes-Dux (PI), Sean Brophy (Co-PI), Johannes Strobel (Co-PI).

The National Science Foundation: Gender Research on Adult-child Discussions in Informal ENgineering environmentTs (GRADIENT) (Jan 2012-Dec 2014), \$184,301. Co-PI. Co-investigators: Gina Svarovsky (PI; Science Museum of Minnesota).

The National Science Foundation: Informal Pathways to Engineering: Using Social Cognitive Career Theory to Understand How Informal Engineering Programs can Support Children's Sustained Interest and Participation in Engineering (Jan 2012-Dec 2014), \$1,777,614. Senior Personnel (co-wrote proposal). Co-investigators: Marisa Wolsky (PI; WGBH), Christine Paulsen (Senior Personnel; Concord Evaluation Group).

The National Science Foundation: IDEA-Pen: Interactive Design and Analysis through a Pen-Based Interface (October 2013-September 2015), \$200,000, Co-PI. Co-investigator: Karthik Ramani (PI).

The National Science Foundation: Expert-Novice Framework to Support Student and Instructor Feedback on Design (July 2013-July 2017), \$300,000, PI. Co-investigator: Heidi Diefes-Dux (Co-PI).

The National Science Foundation: CAREER: Mathematics as a Gatekeeper to Engineering: The Interplay between Mathematical Thinking and Design Thinking (Oct 2011-Sept 2017), \$438,969.00. PI.

The National Science Foundation: Measuring the Effects of Precollege Engineering on the Experience of Engineering Students (March 2013-February 2018) \$271,081. Co-PI: 50%. Co-investigators: Noah Salzman (PI; Boise State University) Matthew Ohland (Co-PI; Purdue University).

Purdue University College of Engineering, Engineering Faculty Conversation in Healthcare and Medicine Seed Grant program. "Training and Tools to Promote Convergence and Drive Discovery in Life-Sciences" Co-PI with David Umulis (PI) \$75,000

The National Science Foundation: RET Site: Collaborative Research: Sustainable Electronics, \$438,582 09/15/2015 -08/31/2019, Evaluator. PI: Inez Hua.

The National Science Foundation: Integrated STEM and Computing Learning in Formal and Informal Settings for Kindergarten to Grade 2 (October 2015-September 2019), \$2,044,930.00, PI. Co-investigators: Sean Brophy, Morgan Hynes, Tamara Moore, Senay Purzer.

The National Science Foundation: Collaborative Research: Strengthening the STEM Pipeline for Elementary School African Americans, Hispanics, and Girls by Scaling Up Summer Engineering Experiences (S2E2K), \$272,804 09/01/2016 -08/31/2020, Purdue PI until Aug 2019 – overall project led by NSBE.

The National Science Foundation: Engineering Research Center for Innovative and Strategic Transformation of Alkane Resources – CISTAR, \$16,327,195.00 (to date) (directly oversaw \$47,728.47), 10/01/2017-09/30/2022, Director of Pre-College Education until Aug 2019. PI: Fabio Ribiero

The National Science Foundation: Research Initiation: Computational thinking in Biological Engineering (August 1, 2018-July 31, 2021), \$ 199,710.56. PI: David Umulis. *I was not able to serve as Co-PI while serving as a Program Director at the National Science Foundation, but I continued contributing to the project.*

The National Institutes of Health: Augmented Reality Platform for Feedback and Assessment in STEM Elementary Education, \$300,000 awarded to Explore! Interactive; sub-award \$49,719 02/15/2020-02/15/2021, Purdue PI.

OTHER FUNDING

2008 Purdue Research Foundation International Travel Grant, travel to Loughborough for the *Mathematical Education of Engineers* conference. \$1000.

PUBLICATIONS

FULL ARTICLES IN REFEREED PUBLICATIONS

1. Cardella, Monica E. and Cynthia J. Atman "A Qualitative Study of the Role of Mathematics in Engineering Capstone Design Projects," in Aung, W. King, R., Moscinski, J., Ou S., and Sanchez Ruiz, L., (Eds.) 2005 *iNEER Sepcial Volume: INNOVATIONS 2005- WORLD INNOVATIONS IN ENGINEERING EDUCATION AND RESEARCH*, Begell House Publishing, USA, pp. 347- 362.
2. Atman, Cynthia J., Monica E. Cardella, Jennifer Turns and Robin Adams "Comparing Freshman and Senior Engineering Design Processes," *Design Studies*, Vol. 26, No. 4, 2005, p. 325-357.
3. Cardella, Monica E., Cynthia J. Atman and Robin S. Adams "Mapping Between Design Activities and External Representations for Engineering Student Designers," *Design Studies* Vol. 27, No. 1, 2006, p. 5-24.

4. Turns, Jennifer, Robin Adams, Joshua Martin, Monica Cardella, Cynthia J. Atman and Joshua Newman "Tackling the Research-to-Teaching Challenge in Engineering Design Education: Making the Invisible Visible," the *International Journal of Engineering Education*, Vol. 22, No. 3, 2006, p. 598-608.
5. Atman, Cynthia J., Robin S. Adams, Monica E. Cardella, Jennifer Turns, Susan Mosborg, and Jason Saleem, "Engineering Design Processes: A Comparison of Students and Expert Practitioners", the *Journal of Engineering Education*, Vol. 96, No. 4, 2007, p. 359-379.
6. Cardella, Monica E., Cynthia J. Atman, Jennifer Turns, Robin Adams "Students with Differing Design Processes as Freshmen: Case Studies on Change" *International Journal of Engineering Education*. Vol. 24, No. 2, 2008.
7. Cardella, Monica E. "Which Mathematics Should We Teach Engineering Students? An Empirically-Grounded Case for Mathematical Thinking" *Teaching Mathematics and its Applications*, Vol 27, No. 3, 2008, p. 150-159.
8. Cardella, Monica E., Stephen R. Hoffmann, Matthew W. Ohland, and Alice L. Pawley "Sustaining Sustainable Design through "Normalized Sustainability" in a First-Year Engineering Course" the *International Journal of Engineering Education*. Vol. 26, No. 2, 2010.
9. Hong, Tao, Purzer, Şenay, and Monica E. Cardella "A Psychometric Re-Evaluation of the Design, Engineering and Technology (DET) Survey" the *Journal of Engineering Education*, Vol. 100, No. 4, 2011, p. 800-818.
10. Hsu, Ming-Chien, Şenay Purzer and Monica Cardella, "Elementary Teachers' Views about Teaching Design, Engineering, and Technology," *Journal of Pre-College Engineering Education Research*, Vol 1, No. 2, 2011, p. 31-39.
11. Zoltowski, Carla B., Monica E. Cardella and William C. Oakes "Students' Ways of Experiencing Human-Centered Design" the *Journal of Engineering Education*, Vol. 101, No. 1, January 2012.
12. Diefes-Dux, Heidi A., Judith S. Zawojewski, Margret A. Hjalmarson, and Monica E. Cardella. "A Framework for Analyzing Feedback in a Formative Assessment System for Mathematical Modeling Problems" *Journal of Engineering Education*, Vol. 101, No. 2, April 2012.
13. Wertz, Ruth E. H., Michael J. Fosmire, Şenay Purzer, and Monica E. Cardella "Assessing Information Literacy Skills Demonstrated in an Engineering Design Task," the *Journal of Engineering Education*, Vol. 102, No. 4, October 2013.
14. Rao, Ranjani, Stephen R. Hoffmann, Alice L. Pawley, Monica E. Cardella, Matthew W. Ohland, "An Ecofeministic Grounded Analysis of Sustainability in Engineering Education: Skill-Set, Discipline or Conscience," the *International Journal of Engineering Education* Vol 29, No. 6, 2013, p. 1472-1479.
15. Jung, Hyunyi, Kelsey J. Rodgers, Aladar K. Horvath, Heidi Diefes-Dux, and Monica E. Cardella "Characteristics of Feedback that Influence Student Confidence and Performance during Mathematical Modeling" *Mathematical Thinking and Learning*, Vol 31, No. 1, 2015, p. 42-57.
16. Rodgers, Kelsey J., Aladar K. Horvath, Hyunyi Jung, Amanda Fry, Heidi Diefes-Dux, and Monica E. Cardella "Students' Perceptions of and Responses to Instructor and Peer Feedback," *Interdisciplinary Journal of Problem-Based Learning*. Vol 9, No. 2, 2015.
17. Tolbert, DeLean, Patrice M. Buzzanell, Carla B. Zoltowski, Antonette Cummings, and Monica E. Cardella. "Giving and responding to feedback through visualisations in design critiques," *CoDesign* Vol 12 No. 1-2 2016, p. 26-38.
18. Cardella, Monica E., Heidi A. Diefes-Dux and Farshid Marbouti "Written Feedback on Design: A Comparison of Students and Educators," *International Journal of Engineering Education* Vol 32 No. 3B, 2016, 1481-1491.
19. Adams, Robin S., Monica Cardella, and Şenay Purzer. "Analyzing design review conversations: Connecting design knowing, being and coaching," *Design Studies* Vol 45, Part A, 2016, p. 1-8.
20. Marbouti, Farshid, John Mendoza-Garcia, Heidi A. Diefes-Dux & Monica E. Cardella "Written feedback provided by first-year engineering students, undergraduate teaching assistants, and educators on design project work," *European Journal of Engineering Education*, 2017, DOI: 10.1080/03043797.2017.1340931
21. Shroyer, Kathryn, Terri Lovins, Jennifer Turns, Monica E. Cardella, and Cynthia J. Atman "Timescales and Ideospace: An Examination of Idea Generation in Design Practice" *Design Studies*, 2018, 28 pages, <https://doi.org/10.1016/j.destud.2018.03.004>
22. Svarovsky, Gina N., Catherine Wagner & Monica E. Cardella "Exploring moments of agency for girls during an engineering activity," *International Journal of Education in Mathematics, Science and Technology (IJEMST)*, Vol 6, No. 3, 2018, 302-219.

23. Ehsan, Hoda, Abeera P. Rehmat, & Monica E. Cardella, "CS unplugged: Designing a puppy playground using computational thinking," *Science and Children*, Vol 57, No. 3, 2019, 24-29.
24. Cardella, Monica E., William Oakes, Nussabah A. Mulaweh & Andrew Pierce "Human-centeredness in undergraduate engineering students' representations of engineering design," *International Journal of Engineering Education*, Vol 36, No. 2, 2020 600-613.
25. Ehsan, Hoda, & Monica E. Cardella, "Capturing Children with Autism's Engagement in Engineering Practices: A Focus on Problem Scoping, *Journal of Pre-College Engineering Education Research (J-PEER)*, Vol 10 No. 1, 2020.
26. Rehmat, Abeera P., Hoda Ehsan, & Monica E. Cardella, "Instructional strategies to promote computational thinking for young learners," *Journal of Digital Learning in Teacher Education*, Vol 36, No. 1, 2020, 46-62.
27. Ehsan, Hoda, Abeera P. Rehmat, & Monica E. Cardella, "Computational thinking embedded in engineering design: capturing computational thinking of children in an informal engineering design activity," *International Journal of Technology and Design Education* (2020). <https://doi.org/10.1007/s10798-020-09562-5>
28. Lee, Walter C., David B. Knight, and Monica E. Cardella. "Promoting Equity by Scaling Up Summer Engineering Experiences: A Retrospective Reflection on Tensions and Tradeoffs." *Journal of Pre-College Engineering Education Research (J-PEER)* 11, no. 1 (2021): 8.

BOOKS EDITED

1. Cardella, Monica E., Chell E. Nyquist, Matthew W. Ohland and A. Van Epps (Eds.). *Ideas To Innovation PKG Purdue University*, Boston, MA: Pearson Learning Solutions, 2010.
2. Purzer, Şenay, Johannes Strobel and Monica E. Cardella (Eds.) *Engineering in Pre-College Settings: Research, Policy and Practices*, Purdue University Press, 2014.

PEER-REVIEWED CHAPTERS IN BOOKS

1. Hjalmarson, Margret, Monica E. Cardella and Robin Adams, "Uncertainty and Iteration in Design Tasks for Engineering Students," in Lesh, Richard, Eric Hamilton and James Kaput (eds.) *Models & Modeling as Foundations for the Future in Mathematics Education*, Lawrence Erlbaum, 2007.
2. Cardella, Monica E. "Mathematical Modeling in Engineering Design Projects: Insights from an Undergraduate Capstone Design Project and a Year-Long Graduate Course," in Lesh, Richard et al. (eds.) *Modeling Students' Mathematical Modeling Competencies*, Springer, 2010.
3. Cardella, Monica E. "Chapter 18: User-Centered Design and Needfinding" in Cardella, M. E., Chell E. Nyquist, Matthew W. Ohland and A. Van Epps (Eds.). *Ideas To Innovation PKG Purdue University*, Boston, MA: Pearson Learning Solutions, 2010.
4. Cardella, Monica E., Carla B. Zoltowski and William C. Oakes, "Developing Human-Centered Design Practices and Perspectives through Service Learning" in Baillie, C., Riley, D. and Pawley, A. (eds.) *Engineering and Social Justice: In the University and Beyond*. Purdue University Press, 2012.
5. Cynthia J. Atman, Ozgur Eris, Janet McDonnell, Monica E. Cardella and Jim Borgford-Parnell, "Engineering Design Education: Research, Practice and Examples that Link the Two," in Aditya Johri and Barbara Olds (Eds.). *The Cambridge Handbook of Engineering Education Research*, Cambridge University Press, January 2014.
6. Hsu, Ming-Chien, Monica E. Cardella and Şenay Purzer, "Assessing design" In Purzer, Şenay, Johannes Strobel and Monica E. Cardella (Eds.) *Engineering in Pre-College Settings: Research, Policy and Practices*, Purdue University Press, 2014.
7. Monica E. Cardella, Noah Salzman, Şenay Purzer and Johannes Strobel, "Assessing engineering knowledge, attitudes and behaviors" In Purzer, Şenay, Johannes Strobel and Monica E. Cardella (Eds.) *Engineering in Pre-College Settings: Research, Policy and Practices*, Purdue University Press, 2014.
8. Dorie, Brianna and Monica E. Cardella "Engineering at Home" In Purzer, Şenay, Johannes Strobel and Monica E. Cardella (Eds.) *Engineering in Pre-College Settings: Research, Policy and Practices*, Purdue University Press, 2014.
9. Cardella, Monica, Şenay Purzer and Johannes Strobel. "The Future of Pre-College Engineering Education" In Purzer, Şenay, Johannes Strobel and Monica E. Cardella (Eds.) *Engineering in Pre-College Settings: Research, Policy and Practices*, Purdue University Press, 2014.
10. Cummings, Antonette, DeLean Tolbert, Carla Zoltowski, Cardella, Monica E., and Patrice M. Buzzanell "A Quantitative Exploration of Student-Instructor Interactions Amidst Ambiguity" in Adams, R.S. and Junaid A. Siddiqui (Eds.), *Analyzing Review Conversations*, Purdue University Press, 2015.

11. Shroyer, Kathryn, Jennifer Turns, Terri Lovins, Monica Cardella, and Cynthia J. Atman, "Team Idea Generation in the Wild: A View from Four Timescales " In *Analysing Design Thinking: Studies of Cross-Cultural Co-Creation*, CRC Press, Taylor & Francis, July 2017.
12. Ehsan, Hoda and Monica E. Cardella "First Graders' Design Processes During a Field Trip Activity: Expanding Problem and Solution Spaces" In Sanzo, Karen, Jay Paredes Scribner, Jason A. Wheeler and Kate Wolfe Maxlow *Design Thinking: Research, Innovation, and Implementation*, Information Age Publishing, 2021.

PEER-REVIEWED CONFERENCE PAPERS IN PUBLISHED PROCEEDINGS

1. Cardella, Monica E., Cynthia J. Atman, Robin S. Adams and Jennifer Turns "Engineering student design processes: Looking at evaluation practices across problems," *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, June 2002, Montreal, Canada.
2. Turns, Jennifer, Cynthia J. Atman, Monica Cardella and Robin Adams "Do we see within-subject change? Four cases of engineering student design processes," *Proceedings of the International Conference of the Design Research Society*, September 2002, London, England.
3. Atman, Cynthia J., Jennifer Turns, Monica E. Cardella and Robin Adams "The Design Processes of Engineering Educators: Thick Descriptions and Potential Implications" *Design Thinking Research Symposium VI Proceedings*, November 2003, Sydney, Australia.
4. Cardella, Monica E. and Cynthia J. Atman "A Qualitative Study of the Role of Mathematics in Engineering Capstone Design Projects," *Proceedings of the 2004 International Conference on Engineering Education, ICEE-2004*, Gainesville, FL 2004.
5. Turns, Jennifer, Robin Adams, Joshua Martin, Susan Mosborg, Monica Cardella, Joshua Newman and Cynthia J. Atman "Tackling the Research to Teaching Challenge in Engineering Design Education" *Mudd Design Workshop V: Learning and Engineering Design, Proceedings of a workshop*, May 2005, Claremont, California.
6. Mosborg, Susan, Robin Adams, Rebecca Kim, Cynthia J. Atman, Jennifer Turns and Monica Cardella "Conceptions of the Engineering Design Process: An Expert Study of Advanced Practicing Professionals," *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, June 2005, Portland, Oregon.
7. Cardella, Monica E. and Cynthia J. Atman "Engineering Students' Mathematical Problem Solving Strategies in Capstone Projects," *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, June 2005, Portland, Oregon.
8. Cardella, Monica E., Cynthia J. Atman, Jennifer Turns, Robin Adams "Students with Differing Design Processes as Freshmen: Case Studies on Change" *Mudd Design Workshop VI: Design and Engineering Education in a Flat World, Proceedings of a Workshop*, May 2007, Claremont, California.
9. Cardella, Monica E. and Cynthia J. Atman "Engineering Students' Mathematical Thinking: In the Wild and with a Lab-based Task," *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, June 2007, Honolulu, Hawaii.
10. Cardella, Monica E. "Mathematical Modeling in Engineering Design Projects: Insights from an Undergraduate Capstone Design Project and a Year-Long Graduate Course," *The Thirteenth International Conference on the Teaching of Mathematical Modeling and Applications*, July 2007, Bloomington, Indiana.
11. Cardella, Monica E. and Micah Lande "Ambiguity as a Bridge Between Mathematical Thinking and Design Thinking," *Design Thinking Research Symposium VII Proceedings*, September 2007, London.
12. Cardella, Monica E. "What your engineering students might be learning from their mathematics pre-reqs (beyond integrals and derivatives)" *Proceedings of the ASEE/IEEE Frontiers in Education Conference*, October 2007, Milwaukee, WI.
13. Cardella, Monica E. "Which Mathematics Should We Teach Engineering Students? An Empirically-Grounded Case for a Broad Notion of Mathematical Thinking Mathematical Education of Engineers" *14th SEFI (MWG) Conference joint with IMA*, April 2008, Loughborough, UK.
14. Strobel, Johannes and Monica Cardella "Compound Problem Solving: Work-Place Research to Inform Engineering Education," *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, June 2008, Pittsburgh, Pennsylvania.
15. Cardella, Monica E., Stephen R. Hoffmann, Matthew W. Ohland, and Alice L. Pawley "Sustaining Sustainable Design through "Normalized Sustainability" in a First-Year Engineering Course" *Mudd Design Workshop VII: Sustaining Sustainable Design Education, Proceedings of a Workshop*, May 2009, Claremont, California.

16. Cardella, Monica E., Heidi A. Diefes-Dux, Matthew Verleger and Amber Oliver, "Insights into the Process of Providing Feedback to Students on Open-ended Problems", *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, June 2009, Austin, Texas.
17. Hsu, Ming-Chien and Monica E. Cardella, "The Use of Mathematical Thinking to Deal with Uncertainty in a Capstone Design Course," *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, June 2009, Austin, Texas.
18. Hsu, Ming-Chien, Monica Cardella, and Şenay Purzer. "Elementary Students' Learning Progressions and Prior Knowledge on Engineering Design Process." Presented at the *National Association for Research in Science Teaching*, March 2010, Philadelphia.
19. Cardella, Monica*, Robert Davis, Shripad Revankar, Loring Nies, Carolyn Percifield, and Leah Jamieson "A Multi-Faceted Strategic Planning Process for Innovation", *Proceedings of the Annual American Society of Engineering Education Conference*, Louisville, KY, June 2010, 8 pages.
20. Hsu, Ming-Chien, Monica Cardella, Şenay Purzer, and Noemi Mendoza Diaz, "Elementary Teachers' Perceptions of Engineering and Familiarity with Design, Engineering and Technology: Perspectives from a National Population." In the *Proceedings of the 2010 American Society for Engineering Education Annual Conference & Exposition*, June 2010, Louisville, KY.
21. Hsu, Ming-Chien, Monica Cardella and Şenay Purzer "Assessing Elementary Teachers' Design Knowledge Before and After Introduction of a Design Process Model." In the *Proceedings of the 2010 American Society for Engineering Education Annual Conference & Exposition*, June 2010, Louisville, KY.
22. Chae, Yoojung, Şenay Purzer and Monica Cardella "Engineering literacy." In the *Proceedings of the 2010 American Society for Engineering Education Annual Conference & Exposition*, June 2010, Louisville, KY.
23. Yun, Juyeon, Monica Cardella, Şenay Purzer, Ming-Chien Hsu, and Yoojung Chae "Development of the Parents' Engineering Awareness Survey (PEAS) According to the Knowledge, Attitudes, and Behavior Framework." In the *Proceedings of the 2010 American Society for Engineering Education Annual Conference & Exposition*, June 2001, Louisville, KY.
24. Zhang, Sili and Monica Cardella "The Engineering Self at a Transitional Stage" In the *Proceedings of the International Conference of the Learning Sciences*, June 2010, Chicago.
25. Hsu, Ming-Chien, Monica Cardella and Şenay Purzer "Development of an Instrument to Assess Elementary Students' Engineering Design Process Knowledge." P-12 Engineering and Design Education Research Summit, August 2010, Seaside, OR.
26. Cardella, Monica, Şenay Purzer, Jueyon Kluin and Ming-Chien Hsu "Assessing Knowledge, Attitudes, and Behavior in Engineering and Design: Perspectives from P-12 Students, Teachers and Parents." P-12 Engineering and Design Education Research Summit, August 2010, Seaside, OR.
27. Zoltowski, Carla. B., William C. Oakes, and Monica E. Cardella "Work in Progress- Phenomenographic Approach to Understanding Students' Ways of Experiencing Human-Centered Design," in the *Proceedings of the 40th ASEE/IEEE Frontiers in Education Conference*, October, 2010, Washington DC.
28. Rao, Ranjani, Alice L. Pawley, Stephen R. Hoffmann, Matthew W/ Ohland and Monica E. Cardella "Work in Progress- Development of a Framework to Assess Sustainability Knowledge (ASK) in Engineering Undergraduate Students", in the *Proceedings of the 40th ASEE/IEEE Frontiers in Education Conference*, October, 2010, Washington DC.
29. Melton, Roy B., Carla B. Zoltowski, Monica E. Cardella and William C. Oakes "Work in Progress – Development of a Design Task to Assess Students' Understanding of Human-Centered Design," in the *Proceedings of the 40th ASEE/IEEE Frontiers in Education Conference*, October, 2010, Washington DC.
30. Carnes, Mark T., Monica E. Cardella, and Heidi A. Diefes-Dux "Progression of Student Solutions Over the Course of a Model-Eliciting Activity (MEA)," in the *Proceedings of the 40th ASEE/IEEE Frontiers in Education Conference*, October, 2010, Washington DC.
31. Ross, Meagan, Michael Fosmire, Ruth Wertz, Monica Cardella and Şenay Purzer "Lifelong Learning and Information Literacy Skills and the First-Year Engineering Undergraduate: Report of a Self- Assessment." In the *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, June 2011, Vancouver, CAN.
32. Carnes, Mark, Heidi Diefes-Dux and Monica Cardella "Evaluating Student Responses in Open-Ended Problems Involving Iterative Solution Development in Model-Eliciting Activities." In the *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, June 2011, Vancouver..
33. Fry, Amanda, Monica Cardella and Heidi Diefes-Dux "Student Responses to and Perceptions of Feedback Received on a Series of Model-Eliciting Activities: A Case Study." In the *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, June 2011, Vancouver, CAN.

34. Merugureddy, Raghavi, Amani Salim, Heidi Diefes-Dux and Monica Cardella "Feedback and Assessment of Student Work on Model-Eliciting Activities: Undergraduate Teaching Assistants' Perceptions and Strategies." In the *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, June 2011, Vancouver, CAN.
35. Wertz, Ruth, Meagan Ross, Michael Fosmire, Monica Cardella, and Şenay Purzer "Do Students Gather Information to Inform Design Decisions? Assessment with an Authentic Design Task in First-Year Engineering." In the *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, June 2011, Vancouver, CAN.
36. Hong, Tao, Şenay Purzer and Monica Cardella, "Using Factor Analysis to Re-visit the Teaching Design, Engineering, and Technology (DET) Survey." In the *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, June 2011, Vancouver, CAN.
37. Gong, Xiang, Monica Cardella and Qi Lei "Comparative Study of First-Year Engineering Honors Programs between U.S. and China." In the *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, June 2011, Vancouver, CAN.
38. Wertz, Ruth, Meagan Ross and Şenay Purzer, Michael Fosmire and Monica Cardella "Assessing Engineering Students' Information Literacy Skills: An Alpha Version of a Multiple-Choice Instrument." In the *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*, June 2011, Vancouver, CAN.
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5. Cardella, Monica "Investigating Engineering Students' and Practitioners' Mathematical Thinking" Extended Abstract submitted for the *Research in Engineering Education Symposium*, July 2008.
6. Yun, Juyeon, Monica Cardella, Şenay Purzer, and Ming-Chien Hsu "Parents' Roles in K-12 Education: Perspectives from Science and Engineering Education Research." In the *Proceedings of the American Educational Research Association Annual Meeting*, April 2010, Denver.
7. Merugureddy, Raghavi, Monica E. Cardella and Heidi A. Diefes-Dux and Amani Salim "TAs' Experiences with Providing Feedback on Open-ended Model Eliciting Problems" an extended abstract in the *Proceedings of the Industrial Engineering Research Conference*, May 2011, Reno, NV.
8. Zoltowski, Carla B., Monica E. Cardella and William C. Oakes "The Development of Assessment Tools Using Phenomenography" presented at the *Research in Engineering Education Symposium*, October 2011, Madrid.

9. Cardella, M. & Svarovsky, G.. "Family Conversations During Museum-Based Engineering Experiences." Poster presented at the Colloquium on P-12 STEM Education Conference: Minneapolis, MN. July, 2012.
10. Cardella, Monica E., Carla B. Zoltowski, and William C. Oakes. "Developing Human-Centered Design Approaches: Preparing Professionals to Address Complex Problems" presented at SIGDOC 2012, Oct 03-05 2012, Seattle, WA, USA
11. Svarovsky, Gina and Monica Cardella. "Gender Research on Adult-Child Discussions Within Informal Engineering Environments (GRADIENT): Early Findings." *Annual Meeting of the American Educational Research Association*, San Francisco, CA, April, 2013.
12. Svarovsky, Gina and Monica Cardella Engineering Conversations Between Preschool Girls and Their Parents. With Monica Cardella. *Visitor Studies Association Conference*, Milwaukee, WI, July 2013.
13. Cardella, Monica E., Patrice Buzzanell, Antonette Cummings, DeLean Tolbert and Carla B. Zoltowski "A tale of two design contexts: Quantitative and qualitative explorations of student-instructor interactions amidst ambiguity" *Design Thinking Research Symposium X*, West Lafayette, IN, 2014.
14. Svarovsky, G., Cardella, M., Dorie, B., and King, Z. (2017). Productive forms of facilitation for young girls during engineering activities within informal learning settings. *Annual Meeting of the American Educational Research Association*, April 2017, San Antonio, TX.
15. Tolbert, DeLean, and Monica E. Cardella "The Engineer of 2020 Mindset: Identifying Bridges Between the Socio-Cultural Experiences and Engineering Design Contexts of Eight African American Adolescents", *Mudd Design Workshop X: Design and the Future of the Engineer of 2020, Proceedings of a workshop*, May 2017, Claremont, California.
16. Ehsan, Hoda, Monica Elaine Cardella, and Gina Navoa Svarovsky, "Engineering and Computational Thinking Among Families Engaging With an Exhibit at a Science Center," *Annual Meeting of the American Educational Research Association*, New York, NY, 2018
17. Maxey, Kayla R. ^G, Jessica Rush Leeker^G, Monica E. Cardella, and Morgan M. Hynes "Integrating Social Context in Engineering Experiences to Promote Interests of Diverse Learners," at the Collaborative Network for Engineering and Computing Diversity Conference, Crystal City, VA, May 2018.
18. Rehmat, A. P., Ehsan, H., Yeter, I., Moore, T. J., & Cardella, M. (2019, April). Exploring teachers', and students' perceptions of computational thinking. *Paper presentation at the International Conference of National Association of Research in Science Teaching (NARST) in Baltimore, MD.*
19. Ehsan, H., Cardella, M., & Sanger, M. T. (2020). First Graders' Engineering Design Processes During a Field Trip Activity: Expanding Problem and Solution Spaces. *The National Association of Research on Science Teaching (NARST) Annual Conference. Portland, OR.*
20. Ehsan, H., & Cardella, M. (2019). Advancing Homeschooling Education through Museums: Parents Promote Computational Thinking and Engineering in Children. *Associations of Science and Technology Centers (ASTC)*, Toronto, CAN.
21. Ehsan, H., Cardella, M., & Cardella, P. (2019). Computational Thinking and Engineering for 5-to 7-Year-Olds: An Exhibit Designed to Broaden Participation for a Better Future *Associations of Science and Technology Centers (ASTC)*, Toronto, CAN.
22. Rehmat, A. P., Ehsan, H., & Cardella, M. E. (2019, October). Instructional strategies to engage children in computational thinking. Paper presentation at *the Big10 Maker and CS Education Research Conference*. Indiana University, Bloomington, IN.
23. Cardella, Monica E., Gina Svarovsky and Scott Pattison (2021) "Defining "Engineering" for Informal Learning Environments: An Empirically Grounded Framework and Equity Implications" *Annual Meeting of the American Educational Research Association*, Virtual, April 2021

OTHER CONFERENCE/SYMPOSIA CONTRIBUTIONS

1. Cardella, Monica E. "Engineers' Use of Mathematics in Conceptual Design," Poster presented at the National Academy of Engineering/ Center for the Advancement of Scholarship in Engineering Education Dane and Mary Louise Miller Symposium, October 27, 2006, San Diego, CA.
2. Cardella, Monica E., Hoda Ehsan, Elizabeth Gajdzik, and Connor Hage "Integrated STEM+CT for K-2 In and Out of School" *2018 NSF STEM for All Video Showcase: Transforming the Educational Landscape*. <http://stemforall2018.videohall.com/presentations/1285>

NON-REFEREED REPORTS AND PAPERS

1. Cardella, Monica E., Jennifer Turns, Cynthia J. Atman, Robin Adams. "Analysis of the Senior Follow-Up Data: The Ping Pong and Street Crossing Problems", CELT Technical Report CELT-01-04 Center for Engineering Learning and Teaching, University of Washington, Seattle, WA, 2001.
2. Cardella, Monica E., Jennifer Turns, Cynthia J. Atman, Robin Adams, and Eddie Rhone. "Detailed Descriptions of the Design Processes of Four Engineering Educators", CELT Technical Report CELT-03-01, Center for Engineering Learning and Teaching, University of Washington, Seattle, WA, 2003.
3. Mosborg, Susan, Cynthia J. Atman, Robin Adams, Jennifer Turns, and Monica Cardella. "Study of Engineering Design Expertise Now Underway at the University of Washington." CELT Technical Report number CELT-05-02, Center for Engineering Learning and Teaching, University of Washington, Seattle, WA, 2005.
4. Mosborg, Susan, Monica E. Cardella, Cynthia J. Atman, Robin S. Adams, and Jennifer Turns. Engineering Design Expertise Study Codebook, CELT Technical Report CELT-06-02, Center for Engineering Learning and Teaching, University- of Washington, Seattle, WA 2006.
5. Mosborg, Susan, Monica E. Cardella, Jason J. Saleem, Cynthia J. Atman, Robin S. Adams, and Jennifer Turns. Engineering Design Expertise Study, CELT Technical Report CELT-06-01, Center for Engineering Learning and Teaching, University- of Washington, Seattle, WA, 2006.
6. Cardella, Monica E., Cynthia J. Atman, Jennifer Turns and Robin Adams. Four Examples: the Teaching Challenge of Students with Varying Initial Design Abilities, CELT Technical Report CELT-06-09, Center for Engineering Learning and Teaching, University of Washington, Seattle, WA, 2006.
7. Trina Fletcher, Monique Ross, DeLean Tolbert, James Holly, Monica Cardella, Allison Godwin, and Jennifer DeBoer "Ignored Potential A Collaborative Roadmap For Increasing African American Women In Engineering" written for the National Society of Black Engineers, the Society of Women Engineers, and the Women in Engineering ProActive Network, published 2017.
8. Cardella, Monica E., Gina Svarovsky and Scott Pattison "Engineering Education in Pre-Kindergarten through Fifth Grade" commissioned paper for the National Academy Report *Enhancing Science and Engineering in Prekindergarten through Fifth Grades*.

RESOURCES DEVELOPED BASED ON RESEARCH

The Parents' Guide to Introducing Engineering at Home developed to share research findings with parents and the general population: <https://drive.google.com/file/d/0B4hn6Pse3qQUdXhLMnBKWW1Gcmc/view>
The Engineering Gift Guide a follow-up resource that builds on *the Parents' Guide to Introducing Engineering at Home* (project lead: Elizabeth Gajdzik): <https://engineering.purdue.edu/INSPIRE/EngineeringGiftGuide>
2014-2018 editions

INVITED PRESENTATIONS

- | | |
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| Fall 2018 | "Active Learning Strategies for Engineering Design, Mathematical Modeling and Problem Solving" Inter American University of Puerto Rico, Bayamón Campus, September 21, 2018 |
| Spring 2018 | "Engineering Design – Children, Undergraduates and Practitioners" Guest Lecture in <i>Design Cognition and Learning</i> (graduate course), Arizona State University, April 9, 2018. |
| Spring 2016 | "Engineering Design from Preschool to Professional Practice", Learning Sciences Research Institute, University of Illinois Chicago, April 2016 |
| Spring 2014 | "Engineering at Home, Schools, Museums and Beyond" with Şenay Purzer, Science on Tap (seminar series), March 13, 2014, Lafayette, IN. |
| Fall 2013 | "Do engineers drive trains or make iPods?" at the Silicon Valley Symposium, with Şenay Purzer, September 10, 2013, Mountain View, CA. |
| Fall 2012 | "First-Year Engineering at Purdue: An Iterative Design Process" at Northwestern University, November 6, 2012. |
| Summer 2012 | "First-Year Engineering at Purdue: From Research to Practice," University of Portland, August 3, 2012. |
| Summer 2012 | multi-day faculty development workshop and seminar series Beihang University of Aeronautics and Astronautics, Beijing, China, May 7-21, 2012. <ol style="list-style-type: none">a. "Engineering education and engineering education research in the United States: historical development and recent trends" May 9, 2012,b. "First-Year Engineering Experience at Purdue: Background, Development and Implementation" May 10, 2012, |

	c. “First-Year Engineering Experience at Purdue: Content and Curriculum” May 14, 2012
	d. “First-Year Engineering Experience at Purdue: Pedagogy” May 15, 2012,
	e. “First-Year Engineering Experience at Purdue: Assessment” May 16, 2012
	f. “Engineering Thinking: Studies of Design and Mathematics in Engineering” May 18, 2012
Fall 2011	“Engaging Elementary-Aged Children and Their Parents in Engineering” Society of Women Engineers Annual Conference, with Joan Chadde, Oct 15, 2011, Chicago, IL.
Summer 2011	Invited Panelist: “Best Practices in K-12 Engineering — Assessments of Participant Outcomes” at the American Society for Engineering Education Annual Conference & Exposition, June 2011, Vancouver CAN.
Spring 2011	Invited Panelist: “Young Audiences’ STEAM Conversation and Public Panel” at the Young Audiences: Arts for Learning Annual Conference, April 2011, Indianapolis, IN.
Fall 2010	“Mathematical Thinking in Engineering Design: Ambiguity, Uncertainty, Precision and Accuracy,” University of Maryland, Dec. 8, 2010
Winter 2010	“Engineering the Common Good”, Workshop at the NSF Engineering Education & Centers Awardees meeting, with John Duffy, February 1&2, 2010
Summer 2008	“Engineering is Everywhere,” Rowan University, Engineering Clinics for Teachers Keynote Presentation, July 14, 2008
Summer 2007	“Pathways in P-12 sTEM Education” University of Washington, June 11, 2007
Spring 2007	“User-Centered Engineering Education” Virginia Polytechnic & State University, April 5, 2007
Spring 2007	“Understanding Mathematical Thinking and Engineering Design: Insights and Opportunities for STEM Education” Clemson University, March 27, 2007
Winter 2007	“Mathematical Thinking, Engineering Design and P-12 sTEM Education: Opportunities for Exploration” Purdue University, March 6, 2007
Autumn 2006	“Mathematical Thinking in Engineering Design: Insights from a Cognitive Engineering Perspective” Arizona State University, October 10, 2006.
Spring 2006	“Mathematics and Design in Engineering Education: Insights from a Cognitive Engineering Perspective” University of Georgia, April 19, 2006.
Spring 2005	“Engineering Learning Research at the Center for Engineering Learning and Teaching” American Society for Engineering Education Mathematics and Physics Division Luncheon, with Cynthia J. Atman, June 15, 2005.

SEMINARS

Fall 2013	“The Mathematics and Engineering Design Learning Environments and Experiences (MEDLEE) Group” School of Engineering Education Research Seminar, on September 25, 2013.
Fall 2005	“Portraying Engineering Design Expertise: Empirical Insights” presentation with Cynthia J. Atman to the Ford Motor Company on October 25, 2005 and the Boeing Company on November 3, 2005 (originally presented at the First International Computing Education Research Workshop, October 1, 2005).
Spring 2004	“Engineering Education as an Application of Cognitive Engineering, Mathematics, Representations and Design,” Invited lecture, Industrial Engineering 593.
Winter 2004	“Cognitive Models in Engineering Education: Engineering Educators’ Design Processes” Industrial Engineering Visiting Committee meeting, March 4, 2004
Winter 2004	“Exploring Engineering Education: Thick Descriptions of Engineering Educator's Design Processes” Invited lecture with Cynthia J. Atman, Industrial Engineering 592, January 20, 2004.
Fall 2002	“Center for the Advancement of Engineering Education (CAEE)” Industrial Engineering Visiting Committee meeting, with Cynthia J. Atman, November 15, 2002.

MENTORING EXPERIENCE

Purdue University, School of Engineering Education

Doctoral Committee Chair or Co-Chair

Tikyna Dandridge (expected: 2022), *“Their Ideas Are Brilliant!”: An Exploratory Qualitative Study of How Black Youth Learn STEM in a Culturally Sustaining Hip-Hop Computational STEM Summer Camp*

Donovan Colquitt (expected: 2021), *Pursuit is Purpose: One Black Man’s Persistence Through Engineering Education*

** Recipient of an NSF Graduate Research Fellowship*

Chanel Beebe (expected: 2021), *Community Partner Meaning Making in Socially Engaged Design Settings*
Huma Shoaib (2021), *Investigating Computational Identity: A Qualitative Study Of Undergraduates Participating In A Thermodynamics Course*
Jessica Rush Leeker (2020), *But, Is It Working? Mentor Involvement In Informal Elementary Stem Programs. A Collective Case Study*
Hoda Ehsan (2020), *Capturing the Engineering Design Thinking of Children with Mild Autism*
Tamecia Jones (2018), *Unobtrusive Assessment of Engineering Learning*
Trina Fletcher (2017), *Academic and STEM Interest Outcomes for Female Students within a Summer Program: Single Sex versus Coeducation*
John Mendoza-Garcia (2016), *A Phenomenographic Study of the Ability to Address Complex Socio-Technical Systems Via Variation Theory*
DeLean Tolbert (2016), *Living, Learning, and Leveraging: An Investigation of Black Males Accessing Community Cultural Wealth and Developing Engineering Attributes*
Brianna Dorie (2015), *Informal Use of Storybooks for Engineering Development in Young Children*
Ming-Chien Hsu (2015), *Undergraduate Engineering Students' Experiences with Interdisciplinary Learning*
Meagan Pollock (2014), *Examination of High School Female's Experiences in Engineering*
** Recipient of an NSF Graduate Research Fellowship*

Doctoral or Masters Committee Member

Degree in Progress

Barbara Fagundes, Engineering Education (Doctoral committee member)
Tasha Zephrein, Engineering Education (Doctoral committee member)

Degree Completed

Chanel Beebe, Industrial Engineering (Masters committee member)
Donovan Colquitt, Technology Leadership and Innovation (Masters committee member)
Les Grundman, Engineering Education (Doctoral committee member)
Yu Gong, Engineering Education (Doctoral committee member)
Ali Shafaat, PhD, Civil Engineering (Doctoral committee member)
Sergey Dubikovskiy Engineering Education (Doctoral committee member)
Devarajan Ramanujan, Mechanical Engineering (Doctoral committee member)
Antonette Cummings, Engineering Education (Doctoral committee member)
Anirudh Sriram, Mechanical Engineering (Masters committee member)
Canek Philips, Engineering Education (Doctoral committee member)
Corey Schimpf, Engineering Education (Doctoral committee member)
Justin Hess, Engineering Education (Doctoral committee member)
James Cawthorne, Engineering Education (Doctoral committee member)
Les Grundman, Engineering Education (Doctoral committee member)
Kelsey Rodgers, Engineering Education (Doctoral committee member)
Michele Yatchmeneff, Engineering Education (Doctoral committee member)
Nicole Pitterson, Engineering Education (Doctoral committee member)
Anne Lucietto, Engineering Education (Doctoral committee member)
Farrah Fayaz, Engineering Education (Doctoral committee member)
George Ricco, Engineering Education (Doctoral committee member)
Yi Luo, Learning, Design & Technology (Doctoral committee member)
James Huff, Engineering Education (Doctoral committee member)
Noah Salzman, Engineering Education (Doctoral committee member)
Emily Dringenberg, Engineering Education (Doctoral committee member)
Dana Denick, Engineering Education (Doctoral committee member)
Celia (Rui) Pan, Engineering Education (Doctoral committee member)
Lindsey Nelson, Engineering Education (Doctoral committee member)
Michele Strutz, Engineering Education (Doctoral committee member)
Carla Zoltowski, Engineering Education, (Doctoral committee member)
Joe Kim, Industrial Technology, (Masters Thesis committee member)
Sili Zhang, Anthropology (Masters Thesis committee member)

External thesis evaluations

2016	External thesis reviewer for Swinburne University of Technology: Scott Daniels
2007	External thesis reviewer for the University of Queensland (similar to the role of a committee member): Janthea Andersen, “An Empirical Study of Design Management Practices in the Construction Industry”

Postdoctoral and Visiting Scholars

March 2018 - July 2018	Abeera Rehmat, Postdoctoral Researcher
Sept. 2017 – July 2019	Ibrhaim Yeter, Postdoctoral Researcher
August 2016 – 2017	John Mendoza Garcia, Postdoctoral Researcher
May 2011-Aug 2011	Min Wang, Visiting Scholar
Sept. 2010-Aug 2011	Xiang Gong, Visiting Scholar
August 2010-May 2010	Tao (Tom) Hong, Postdoctoral Research (with Senay Purzer)
August 2009- 2010	Yoojung Chae, Postdoctoral Researcher
Aug 2007-August 2009	Noemi Mendoza-Diaz, Postdoctoral Researcher (direct supervisor Jan 2009-Aug 2009)

Undergraduates

Summer 2018- 2019	Sarah Whisman, K-5 Engineering Design and Computational Thinking
Spring 2018 – 2019	Carson Ohland (freshman/sophomore), Computational Thinking Amongst K-2 nd Grade-Aged Children Engaged in Science Center Activities. Paper presented at the FIE 2018 conference.
Spring 2018	Melissa Gillbanks, Iteration in Engineering Design Processes (Independent Study)
Summer 2017- Fall 2018	Zachary Beyer (junior/senior), Design Thinking and Mathematical Thinking in Engineering – Differences Between Engineering, Mathematics and Design Students (poster presented at the 2018 ASEE IL/IN Regional Conference; received award for Best Poster)
Spring 2017	Jack Mueller (senior), Engineering Design Processes: Children, First-Year Engineering Students, and Graduating Seniors (Independent Study,
Spring 2017	Arman Shroff, Mathematics as a Gatekeeper to Engineering
Spring 2017	Yicheng Zhou, Mathematics as a Gatekeeper to Engineering
Fall 2016- Spring 2017	Sahil Bhalla, Mathematics as a Gatekeeper to Engineering
Fall 2016- Spring 2017	Clayton Steele, Mathematics as a Gatekeeper to Engineering
Fall 2016- Sum 2017	Shrishti Jagamohan, Mathematics as a Gatekeeper to Engineering
Fall 2016- Spring 2017	Ashley Van Wormer (poster presented at the 2017 Purdue Undergraduate Research Symposium)
Fall 2016	Nancy Garduno, Mathematics as a Gatekeeper to Engineering
Fall 2016	Veronica Vera-Llanos, Mathematics as a Gatekeeper to Engineering
Sum 2016- Sum 2017	Reis Lehman (sophomore/junior), Design Thinking and Mathematical Thinking in Engineering; Quality of Final Designs.
Spring 2016	Joel Phillips (junior/senior), Engineering Learning in Play Contexts
Fall 2015- Spring 2016	Guannan Liu (senior), Quantitative reasoning in engineering design. Paper prepared for the ASEE 2016 conference.
Spring-Summer 2014	Jacob Inman (senior), Investigating gender differences in learning-related toy purchases Analysis of consumer review data to investigate trends in educational toy purchases. Paper presented at the ASEE 2015 conference.
Spring 2011	Peter O'Banion (freshman). Measuring high school students' design process knowledge (Spring 2011). Developed and pilot tested an online and media rich version of the Design Process Knowledge Task to measure high school students' understanding of the engineering design process.
Spring 2009	Kenneth Okine (freshman), Engaging Pre-College Students in the NAE Grand Challenges (Spring 2009). Developed and administered a survey to measure high school students' interests in the NAE Grand Challenges.

ADVISORY BOARDS

2021- present	External Advisor for the NSF-funded “Engineering a Community-Family Partnership: Developing a Program Aimed at Making and Design Practices in Home Environments”
2016-2019	External Advisor for the NSF-funded “Advancing Out-of-School Learning of Mathematics and Engineering” project
2015- 2018	External Advisor for the NSF-funded “Head Start on Engineering” project
2015 – 2017	External Evaluator for the NSF-funded “Developing Artifact Peer Review Assignment Methodologies to Maximize the Value of Peer Review for Students” project
2014 – 2018	External Advisor for the NSF-funded “Impacts of Prior Work Experience on Adult, Non-traditional, Engineering Students” project
2012	External Evaluator for the “Making Meaning” report, generated after the 2012 Maker Faire and Making Meaning Symposium, New York, NY.
2011-2015	External Advisor for the Mobile Area Education Foundation for the NSF-funded “Engaging Youth in Engineering” program
2010-2013	External Advisor for Concord Consortium on the NSF-funded “Engineering Energy Efficiency” project
2010- 2012	External Advisor for the Utah State University NSF-funded “Exploring Engineering Design Knowing and Thinking as an Innovation in STEM Learning” project
2010-2011	Evaluator for the Family Engineering Program’s publication “Family Engineering: An Activity & Event Planning Guide”

TEACHING

COURSES TAUGHT AT PURDUE

ENE 595: Social Construction of Knowledge: Analysis of Video Data

Engineering Education PhD students
Spring 2017, Spring 2014, Fall 2013

ENE 595: Social Construction of Knowledge: Learning in Out-of-School and Informal Environments

Engineering Education PhD students
Fall 2015, Fall 2012, Fall 2011

ENE 595: Cognitive Engineering

Engineering Education PhD students; Industrial Engineering PhD Students; Education PhD students and Multidisciplinary Engineering undergraduates (juniors/seniors)
Fall 2016, Fall 2015, Fall 2013, Spring 2012, Spring 2010, Spring 2008

IDE 495: Design Methodologies for Diverse Stakeholders

* *permanent course number assigned in Spring 2019: IDE 385*
Multidisciplinary Engineering undergraduates (juniors/seniors)
Fall 2018, Fall 2017

ENGR 131: Ideas to Innovation I, on the **course leadership team** (and taught 1 section)

First-Year Engineering students (primarily freshmen)
Spring 2015, Fall 2014, Spring 2014, Fall 2013, Spring 2013, Fall 2012, Spring 2012, Fall 2011, Spring 2011, Fall 2010, Spring 2010
Course coordinator, Spring 2012-Spring 2013

ENGR 126: Engineering Problem Solving and Computer Tools

First-Year engineering students
Fall 2008, Fall 2007

SHORT COURSES AND WORKSHOPS TAUGHT

January 2018 “Pushing the Limits with Engineering,” with Kayla Maxey, Jessica Rush Leeker and Morgan Hynes, Indiana STEM Education Conference, West Lafayette, IN.

June 2017	“Educators’ constructive feedback on students’ design work” with Farshid Marbouti, John Mendoza-Garcia ^{PD} , Heidi Diefes-Dux, and Matthew Verleger, the 2017 American Society for Engineering Education Annual Conference & Exposition, Columbus, OH.
February 2017	“Pre-College Engineering: A Serious Endeavor,” Purdue University’s President’s Council Weekend Back to Class session, Naples, FL.
July 2016	“Blue Ocean Strategy & Polarity Management,” Engineering Dean’s ELT & Program Directors Retreat.
January 2016	“Engineering Design Behaviors: From Preschool to Professional Practice”, Indiana STEM Education Conference, West Lafayette, IN.
June 2012	“Assessment in Pre-College Engineering Education Research,” with Şenay Purzer at the American Society for Engineering Education Annual Conference & Exposition, San Antonio, TX.
June 2012	multiple faculty development workshops, including “Authentic Assessment of Student Work on Open-Ended Problems,” (with Heidi Diefes-Dux), “Design thinking in Education and Practice,” (with Carla B. Zoltowski), and Assessment of Design Knowledge and Skills (with Şenay Purzer) presented to delegates from King Fahd University of Petroleum and Mining, Dammam, Saudi Arabia, at Purdue University.
October 2011	Monica E. Cardella, “Mini-Workshop- A Strategy for Assessing Student Work on Open-Ended Problems” with Heidi Diefes-Dux, Frontiers in Education Conference, Rapid City, SD.
October 2011	“Special Session – Assessing Student Learning of Engineering,” with William C. Oakes, Carla B. Zoltowski, Robin S. Adams, Şenay Purzer, Jim Borgford-Parnell, Reid Bailey and Denny Davis, Frontiers in Education Conference, Rapid City, SD.
October 2011	“Engaging Elementary-Aged Children and Their Parents in Engineering” with Joan Chadde at the Society of Women Engineers Annual Conference, Chicago, IL.
Fall 2011	NSF Graduate Research Fellowship Program workshop with Audeen Fentiman & mentoring meetings for Engineering Education graduate students
August 2011	Center for Teaching Excellence, “Micro-Teaching” as part of the Teaching Assistant Orientation program, Purdue University
October 2010	“Mini-Workshop- A Strategy for Assessing Student Work on Open-Ended Problems” with Heidi Diefes-Dux at the Frontiers in Education Conference, Rapid City, SD.
October 2010	“Special Session – Assessing Student Learning of Engineering,” workshop with William C. Oakes, Carla B. Zoltowski, Robin S. Adams, Şenay Purzer, Jim Borgford-Parnell, Reid Bailey and Denny Davis at the Frontiers in Education Conference, Rapid City, SD.
Fall 2010	NSF Graduate Research Fellowship Program workshop & weekly mentoring meetings for Engineering Education graduate students
August 2010	Center for Teaching Excellence, Teaching Assistant Orientation, with Chell Nyquist, Purdue University.
February 2010	“Engineering the Common Good”, Workshop at the NSF Engineering Education Awardees meeting, with John Duffy, February 1&2, 2010
Summer 2009	“Creativity as Part of Strategic Planning,” Purdue University’s College of Engineering Strategic Planning Team Member Training, July 9, 2009.
August 2008	Center for Teaching Excellence, Teaching Assistant Orientation, with Navindram Davendralingam, Purdue University.
September 2004	“Looking at Research on Learning: an Interactive Workshop,” with Atman, Cynthia J. Atman, Theresa Barker and Susan Mosborg, University of Washington College of Engineering TA Workshop

SPECIAL PROJECTS

Summer 2013	Antonette Cummings, “How Do Students Learn to Evaluate Design with Ambiguity?”
Summer 2013	Anne Lucietto, “Informal Learning: What is it?”
Summer 2013	DeLean Tolbert, “Narratives in STEM Education: African American Male Students”
Fall 2012	Noah Salzman, “Phenomenography and Engineering Education”
Fall 2012	Daniel Ferguson, “How do Purdue engineers informally learn professional skills after graduation?”
Summer 2010	Brianna Dorie “Engineering Children’s Literature”

SERVICE

CIVIC AND COMMUNITY ACTIVITIES

- 2015- present Scientific advisor to the Association for Science, Space, Engineering, and Technology Inc. (ASSET) in operation of the Imagination Station science center
- 2014-2019 Leader for Girl Scout Troop 4244
- Workshops delivered for teachers are included under "Short Courses and Workshops Taught"*

SERVICE TO GOVERNMENT OR PROFESSIONAL ORGANIZATIONS

- 2020 External Reviewer, *Science Foundation Ireland*
- 2020 Author, commissioned paper for the National Academy Report *Enhancing Science and Engineering in Prekindergarten through Fifth Grades*
- 2018 External Reviewer, National Academy Report, *Science and Engineering for Grades 6-12: Investigation and Design at the Center*
- 2017-2019 Editor, *Journal of Pre-College Engineering Education Research*
- 2017-2020 Reviewer, *Design Studies*
- 2016-2017 Interim Editor, *Journal of Pre-College Engineering Education Research*
- 2015-2017 Chair, Educational Research and Methods Division, American Society for Engineering Education (ASEE)
- 2014-2017 Program Chair, Informal Learning Environments SIG, American Educational Research Association (AERA)
- 2012-2014 Vice Chair for Frontiers in Education 2014 Programs (2012-2014) & executive leadership board member of the Educational Research and Methods division, ASEE
- 2012-2014 Secretary-Treasurer of the K-12 & Pre-College Engineering Division, ASEE
- 2011-2012 Member-at-Large, Executive Board of the K-12 & Pre-College Engineering Division, ASEE
- 2010-2013 Helen Plants Committee Chairman and Executive Board Member of the Educational Research and Methods Division, ASEE
- 2010 Co-Chair of the *P-12 Engineering and Design Education Research Summit*, August 2010.
- 2007- 2019 Reviewer for the National Science Foundation
- 2011-2019 Founding Co-Editor and Reviewer for the *Journal of Pre-College Engineering Education Research* (J-PEER)
- 2009-present Reviewer for the *International Conference of the Learning Sciences*
- 2008-present Reviewer for the *Journal of Engineering Education*
- 2003-present Reviewer and Session Moderator for the *American Society for Engineering Education*
- 2010-present Reviewer and Session Moderator for the *Frontiers in Education Conference*
- 2004 Reviewer for the Innovations in Engineering Education Special Volume: *INNOVATIONS 2005- WORLD INNOVATIONS IN ENGINEERING EDUCATION AND RESEARCH*.
- 2004 Session Moderator, *International Conference on Engineering Education*.

MAJOR COMMITTEE ASSIGNMENTS IN THE DEPARTMENT, SCHOOL, AND/OR UNIVERSITY

- 2018 Purdue University Press: Director Search Committee
- 2007-2008; 2012- 2019 School of Engineering Education: Undergraduate Curriculum Committee
- 2008-2009; 2012-2019 School of Engineering Education: Faculty Search Committee
- 2007-2008; 2011-2019 School of Engineering Education: Graduate Committee
- 2012-2018 College of Engineering: Faculty Affairs Committee (Chair 2013-2014)
- 2012 School of Engineering Education: Instructional Support Coordinator Search Committee
- 2011 School of Engineering Education Graduate Recruitment Open House Committee (Member; Spring 2011)
- 2010 School of Engineering Education Graduate Research Fellowship application preparation committee
- 2009-present School of Engineering Education: INSPIRE: The Institute for P-12 Engineering Research and Learning
- 2009-2010 College of Engineering Strategic Plan Implementation: Internal Resource Team Co-Captain

2008-2009	School of Engineering Education: Graduate Recruitment Committee; Co-Chair Spring 2009
2009	University: Search Committee for the Innovations in P-12 sTEd Education Initiative
2008	University: STEM Goes Rural Curriculum Committee
2007-2008	University: Strategic Planning Committee for the Innovations in P-12 sTEd Education Initiative

Student Organizations

Aug 2018-Aug 2021	Faculty Advisor for the Purdue Science Olympiad student organization
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PROFESSIONAL MEMBERSHIPS

Alpha Pi Mu, *the Industrial Engineering Honor Society* (2004 - present)
 American Society for Engineering Education (2005 - present)
 American Education Research Association (2007- present)
 Association of Computing Machinery, Special Interest Group on Design of Communication (2012- 2013)
 International Society of the Learning Sciences (2010 - 2017)
 National Association for Research on Science Teaching (2013-2014, 2020)
 National Council on Measurement in Education (2011 – 2013)
 Science Educators for Equity, Diversity and Social Justice (present)
 Visitor Studies Association (2013 - 2014)